

On-Wafer Burn-In of Semiconductor Devices Using Thermal Rollover

ABSTRACT

Apparatus and method for on-wafer burn-in of a semiconductor device. In a preferred
5 embodiment, the present invention is realized using an auto-prober commonly used in scan-
testing of semiconductor devices. Specifically, in one embodiment, the auto-prober is
programmed to sequentially apply an elevated current to each semiconductor device on a
wafer. During the application of the elevated current, which substantially exceeds the normal
operating current of the device, performance characteristics of the device, including its output
10 power, is detected and registered. Preferably, each device is subjected to multiple scans by
the elevated current. The device's performance characteristics is then analyzed. If a device
exhibits consistent power output over different scans, it is not likely to suffer from infant
mortality. If the device exhibits a shift in power output over successive scans, the device is
likely to run into early failure and should be rejected. The multiple scans by the elevated
15 current also stabilize device performance, avoiding further shift when the device is used in
normal operation. Significantly, the present invention utilizes existing testing equipment to
implement on-wafer burn-in and does not require an extended burn-in period, thereby
providing an easily implemented and cost-effective method and system for on-wafer burn-in
not achievable in prior art approaches.